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## THE NATURE OF DEMAND FOR AGRICULTURAL PRODUCTS AND SOME IMPORTANT CONSEQUENCES

It is rather surprising that in the development that has come in recent years along the line of the economics of agriculture so little account should have been taken of the nature of demand with reference to agricultural products and of the very important consequences that arise from the peculiarities of demand for this class of products. In textbooks dealing with this general subject, in periodical literature, and in conferences, attention has been directed almost entirely to considerations relating to production in agriculture. It is proposed in this article to call attention to some of the neglected phases with reference to demand for agricultural products, in the economics of agriculture, and to point out some important applications relative to current problems.

### I

Economists have long recognized that the nature of demand varies greatly with reference to different classes of commodities. One such distinction made is that between elastic and inelastic demand. Demand for a good is said to be elastic when that good is of such a nature that the demand is sensitive to price change or to a change in the purchasing power of the prospective buyer. If the price tends to fall, demand is immediately responsive and tends to increase. If, on the other hand, the price tends to rise, the demand is again immediately responsive, but in an opposite direction, and tends to decrease. Where the demand for a good is inelastic, however, there is lack of sensitiveness to price change. If the price tends to rise, the demand will be influenced little or not at all—depending on the degree of inelasticity characterizing the demand for the commodity in question. If the price tends to fall, again the demand will be influenced relatively little or not at all. Other things being equal, the amount required of the good characterized by inelastic demand varies little from time to time; though this is

much more true of groups of commodities of a similar class than it is of individual commodities of the group, since there is, within the group, the possibility of substitution of one commodity for another.

Though less attention has been given by economists to this other phase of the matter, it is clear that demand is elastic or inelastic, not only with reference to price change, but also—and even more decidedly, at times<sup>1</sup>—with reference to change in purchasing power on the part of the buyer. Diminished purchasing power will have the same effect as increased price in narrowing the demand for a good with an elastic demand, and increased purchasing power will have the same effect as diminished price in stimulating the demand for the same kind of good. The demand for a good with an inelastic demand, however, will remain relatively indifferent to a change in purchasing power, just as it will with reference to a change in price.

It has also been pointed out that there are important reactive influences with reference to the trend of prices in the case of these two kinds of demand and that these influences operate in very different directions in the two cases. Other things being equal, elasticity of demand is said to make for stability of price and inelasticity of demand for instability of price. Under normal conditions, as the price of a good characterized by elastic demand tends to rise, demand, being immediately responsive, tends to decline. This has an immediate effect in checking the rise in price. If the price of a good of the same kind falls, under normal conditions demand immediately broadens, thus tending to check the decline in price. With a good characterized by inelastic demand, however, the situation is quite otherwise. As the price rises, demand remains about constant and there is little or no check

<sup>1</sup> At times when purchasing power is abnormally large or abnormally small, maximum or minimum demand for a good with an elastic demand may coincide with maximum or minimum prices, respectively. In such a case demand is still elastic, but the determining factor is purchasing power—or, in the case of a production good, prospect of profit—rather than price. During normal industrial periods price is relatively more important as a factor governing elasticity of demand.

It may be noted, too, that demand for an article with an elastic demand under normal conditions may become quite inelastic under essentially different circumstances—say in case of war.

to that rise. As the price falls, demand again remains about as before and there is little or no check to fall in price. Price fluctuation is therefore likely to be relatively wide in the case of a good with an inelastic demand and relatively narrow in the case of a good with an elastic demand. It is not so often pointed out, however, that speculation is more common with reference to goods with an inelastic demand, since wide fluctuation in price affords the opportunity to the speculator.

Economists have further pointed out that elasticity of demand characterizes, in the main, those goods which we recognize as comforts and luxuries, while inelastic demand characterizes those classes of goods that we regard as necessities. A certain rather well-defined amount of the latter class of goods we want, and we want this amount so intensely that we are willing to sacrifice other less imperious wants until these are satisfied. But once having secured this minimum of necessities, we become extremely indifferent about an additional supply, so that we are influenced, as consumers, little or not at all by the fact that the price may be very favorable or by the other fact that our purchasing power may have increased. Another fact that is very important in giving the character of inelastic demand to this class of goods generally is that almost everyone is in the same situation of ordinarily consuming about the same amount of necessities regardless of price and of subsequent indifference to further amounts once the minimum supply is obtained. We are all democratic in this respect, though some may consume these commodities in their plainest form while others may consume them expensively elaborated and under luxurious surroundings and with elegant accompaniments. But whether plainly or elaborately wrought, the limit of further consumption is soon reached and we turn to the other classes of commodities to spend our remaining purchasing power. From this point, therefore, the market has little further support from anyone.

With reference to comforts and luxuries the matter is very different. Many, though not the majority, perhaps, commonly enjoy the use of what we know as the comforts of life. All will agree that luxuries are enjoyed by the few. There are thus classes in society with reference to comforts and luxuries. Where com-

forts are enjoyed, additional comforts are desired if the means of obtaining the same are at hand—or perhaps a more generous supply of the same class of comforts is also wanted. If the price declines or if the purchasing power increases, those who were not able to buy and use comforts before will now come forward as purchasers, while those who want to enjoy their use more generously will purchase in larger amounts. If prices rise or if purchasing power declines, demand will be narrowed. Demand is thus expanded or narrowed as the case may be and the market is more or less supported as the case may be. What is true with reference to comforts is much more true with regard to luxuries. Given proper variety, desire for luxuries expands almost without limit as purchasing power increases or as prices decline. Those who already enjoy the use of luxuries see new luxuries that they wish. The appetite for luxuries is one that grows with what it feeds upon. Recruits from the middle and lower classes, whose acquaintance with luxuries is of limited extent, will tend to swell the ranks of the purchasers of articles of luxury if prices fall or if purchasing power increases. Since the enjoyment or use of luxuries is a generally accepted badge of social distinction and class status, these recruits from the middle and lower classes also eagerly seek after luxuries on this account as well as for the positive intrinsic satisfaction which these goods afford. Under these circumstances the market for this class of goods has wide support. In case of higher prices or of lessened purchasing power, however, the demand shrinks throughout a wide circle. Rise in price is thus checked. In case of extreme or abnormal decline in purchasing power in periods of pronounced depression prices may fall decidedly for this class of goods.

## II

Of these important distinctions with reference to the differences in the nature of demand for different classes of goods, thus pointed out by the general theorist in economics, the theorist in the economics of agriculture has strangely made little or no use. He has ignored the possibility of their importance to him, or their significance in his field has escaped his notice. We may now proceed to consider the importance of these distinctions.

It may be said in the first place that agriculture is, generally speaking, an industry which has to do with the production of the more absolute necessities of life, while the non-agricultural industries have to do, in the main, with the production of comforts and luxuries. If this be true—and in spite of important exceptions it is believed to be substantially true—the demand for agricultural products is, generally speaking, inelastic in character and that for non-agricultural products elastic in character.

With reference to food supplies as a whole, it is very evident that demand is relatively inelastic. Food up to a certain rather rigid limit is wanted imperiously and then any further supply for present consumption would be even objectionable. Food supplies may of course be stored in many cases; but storage does not materially affect the total amount of food consumed. As a result of storage there will be a wider variety of foodstuffs available for consumption and there will be a gain in satisfaction from the carrying of a portion of certain foods over from periods of surplus to periods of deficiency. But this is a matter of better seasonal distribution in the consumption of foodstuffs and not of larger consumption of food in general. So far as *production* is concerned, the amount of food may be even less with a system of storage, because waste is thus avoided. In the long run, therefore, production must wait on consumption and storage is but discounting future consumption.

With reference to any particular article of food in the consumption of which there is no fixed custom or habit there may be a considerable measure of elasticity of demand because of the possibility of the substitution of one article of food for another. But the consumption of one article of food in place of another cannot materially increase or decrease the amount of food consumed as a whole. A larger demand for one article would mean simply a smaller demand for other articles.

The amount of waste is another factor that must be considered in estimating the degree of elasticity of demand for a given food product or for the class of foods as a whole. In a country where food has been regularly cheap and plentiful, as in most cases in the past in this country, wasteful habits with reference to the use of

food develop. In periods of scarcity and high prices, therefore, the total demand for food may conceivably be lessened appreciably without limiting actual consumption, if only waste be eliminated. Complete eradication of waste is, of course, not to be expected, as habits of consumption change but slowly. There is neither the disposition nor the information for the accomplishment of this end. There is a very trite saying that a French family can live on what the average American family wastes. If this be true there can be decidedly greater elasticity of demand with reference to food in America than in France. Professor W. O. Atwater estimated, in 1894, more conservatively, the excess of waste in American as compared with European families at 5 per cent to 10 per cent. According to recent government investigations the waste in families in the United States with incomes of less than \$800 per annum amounts to 3 per cent to 4 per cent, while in the case of families with incomes between \$1,000 and \$3,000 the waste frequently amounts to 10 per cent to 25 per cent.

Quite as important as waste in the family, perhaps, is the waste in the marketing of produce—not to speak of the waste in the harvesting of farm products. To take a single illustration, it is estimated that the loss by breakage and wastage in the marketing of eggs in the United States amounts to \$50,000,000 annually. There is also the waste in food that occurs through overeating—no small item in a country like our own.

With regard to these different possibilities of diminished consumption through the elimination of waste it seems probable that it is easy to overestimate the amount of actual saving that may occur in times of straitened purchasing power and therefore easy to overestimate the extent to which the rigidity of demand actually may be lessened by such means. Yet it can hardly be doubted that there is considerably less rigidity of demand with reference to the food supply of a people with a generous and even wasteful standard of living like our own than in the case of the peoples of Asiatic countries or, perhaps, even of Europe.

David A. Wells, in his *Recent Economic Changes* (1st ed., 1889), asserted that in every civilized country where accurate investigations had been made the consumption of all substantial articles

of food, as well as of luxuries, had been, within recent years, largely and progressively increasing; and Mr. Wells quoted M. Leroy-Beaulieu as to a "wonderful increase" in the consumption of food products since 1866. Elsewhere, however, Mr. Wells implies that this apparent increase in the consumption of food on the part of the masses was rather an increase in variety than in total amount, since he admitted that there seemed to be a decline in the consumption of standard commodities like wheat.

There are some special articles of food, however, with reference to which there is substantial proof of large increase in consumption, both in our own and in other countries. The annual per capita consumption of sugar in the United States, for example, increased from an average of 9.65 pounds in the decennium 1790-99 to an average of 72.49 pounds in the decennium 1900-1909, and reached 89.14 pounds in 1914. In England the annual per capita consumption of sugar increased from 15 pounds per capita in 1840 to 92 pounds in 1911. During the same time the per capita consumption of tea more than quintupled in England, that of raisins and currants considerably more than trebled, and that of tobacco more than doubled. It is probable that there has been a somewhat similar increase in the use of certain kinds of fruit in the United States, though many persons born on the farm and now living in the city would be slow to admit that there can be as large consumption of that most important fruit, the apple, with nearly half our population living in cities and other incorporated places of 2,500 and over, as there was when the population was almost wholly agricultural. We read, too, of "enormous quantities" of orchard fruits in Colonial times. Undoubtedly there has been a large gain, since early days, in the *variety* of fruit consumed by the people of this country.

On the other hand, to offset undoubted large increase in the consumption of articles like sugar there is the decrease in consumption in more important articles of food. The per capita annual consumption of meat by the people of this country has been decreasing over a long period and the supply of live stock has diminished in proportion to the population since the first census of farm animals in 1840. Everyone is familiar with the



considerable decrease in meat animals in this country in recent years. Meat is supposed to have constituted about one-half of the dietary of the people of this country in 1840, while by 1900 it had declined to about one-third and has probably declined appreciably since. The consumption of corn as human food has also largely decreased in this country since early days—especially in New England and in the South—and wheat bread has been largely substituted for rye bread in Europe.

On the whole, therefore, such statistics as are available bear out the *a priori* conclusion that the consumption of food on the part of the human animal is relatively fixed in amount and that the demand for food as a whole is relatively rigid and inelastic.

Not a few, however, in considering the nature of the products raised on the farm, seem to assume that the farmer is engaged solely in the production of foodstuffs and that the demonstrated inelasticity of demand for food as a whole proves the practically fixed character of the demand for all agricultural products. This is scarcely admissible, inasmuch as the farmer is engaged to an important extent in the production of the textile fibers—not to speak of still other products of less importance. The demand for the textile fibers depends, of course, upon the demand for clothing; and the demand for clothing—especially in a country like our own—is decidedly elastic in character. In periods of high prices or of straitened purchasing power clothing can be worn a little longer, or the individual may content himself or herself with less than the usual variety of suits or dresses or hats; or, again, the number of occasions for the display of wearing apparel may be reduced and thus the number of gowns or suits required be reduced. Clothing, in the sense that we have come to regard clothing in these times of wealth and refinement, and in the liberal and even prodigal use that we make of it, is not a necessity of life in the sense and to the extent that food is necessary. Yet it may be granted that there is a difference in people in this respect. The demand for dress and clothing is much less elastic, in a downward direction, on the part of those who have once enjoyed the privilege of generous expenditure for dress and who have come, to an exceptional degree, under the stern tyranny of fashion and who may no longer have the

means, apparently, to indulge themselves as before. Such persons may and usually do make very great sacrifices rather than depart from their customary standard of dress. To a certain extent they may even strive to dress at the expense of a lessened consumption of food. We are told that shopgirls will undergo habitual undernutrition in order to dress in the accepted fashion, and doubtless the same thing is true of many persons from other classes when they face the same alternative. The recognition of this fact, however, should not lead us to the opposite extreme. There is a very decided limit to the extent to which food can be sacrificed to dress, and, this limit once reached, there is absolutely no doubt as to the choice that will be made. The demand for food is, in the last resort, inexorable. There can be little doubt that, in general, the demand for clothing—and thus for the textile fibers—is much more elastic, in the downward direction, than that for food.

As between the two classes of commodities the demand in the upward direction is incomparably more elastic in the case of dress or clothing. While the demand for food simply disappears after the rather definite amount of food required is supplied, with increasing means or with lower prices for clothing fabrics there is normally a disposition to move in the direction of ever-larger demand or of ever-increasing expenditure for dress and personal adornment. Alike in variety, in absolute quantity, and in embellishment, there is an almost indefinite tendency toward increase.

Much of the increased use of raw material due to this expansive demand for dress has related to silk and flax—the former of which we do not produce at all and the latter of which we do not produce for textile purposes. Much of the increased use of raw material for dress, however, has related to cotton, and of this we are, of course, by far the most important producers. The per capita consumption of raw wool has not increased in this country for a number of years though the use of cotton, shoddy, and hair as ingredients together with wool has increased largely; and there has been a great increase in the use of so-called woolen clothing. With about 6 per cent of the world's population, the United States produces about 10 per cent of the world's supply of raw wool and uses about 16 per cent of the total. Our use of wool is therefore comparatively heavy, but its

use does not seem to be increasing in this country at present faster than the growth of population.<sup>1</sup>

From 1831 to 1880 the price of cotton cloth decreased from 17 cents to 7 cents per yard, and the annual consumption of raw cotton in manufactures in this country increased from 5.9 pounds per capita at the former date to 19 pounds per capita at the latter date. At present the annual per capita consumption of raw cotton in domestic manufactures in this country is about 29 pounds. Thus, since 1831 the per capita amount of raw cotton consumed each year in domestic manufactures has increased about fivefold. These figures understate somewhat for all three periods the total consumption of cotton, as there was an excess of imports of cotton manufactures over exports in 1831, in 1880, and in 1914. Professor M'Kay, of the University of Georgia, in 1850 estimated that the amount of cotton cloth used by each person in the United States increased from  $11\frac{1}{2}$  yards in 1820 to  $32\frac{1}{2}$  yards in 1850; but it is possible that a part of this increase was due to the substitution of cotton for woolen and linen goods. The statement has also been made that during the century ending with 1872 the consumption of woven cloth of various materials increased from 1 yard to about 26 yards per capita; but this would seem to leave people rather scantily clad at the earlier date. The production of raw cotton in the United States increased from 16.6 pounds per capita in 1820 to about 76 pounds per capita in 1914—the per capita production thus considerably more than quadrupling during this time. Since 1860, however, the total production of cotton in this country has about trebled, while population has more than trebled. In the last fifty years, therefore, the per capita production of cotton in the United States has declined slightly. The improvement in textile machinery has of course made possible a production of cotton cloth that has increased more rapidly than the increase in the raw material used, but this circumstance has probably not affected the demand for raw cotton materially.

<sup>1</sup> From 1840 to 1910 the annual production of wool per capita increased in this country from 2.1 pounds to 3.1 pounds, while imports of raw wool increased from about 0.6 pounds per capita, per annum, to nearly 3.0 pounds per capita during the same period. The per capita consumption of raw wool in this country at present, however, does not seem to be greater than in 1870.

The production of tobacco, another farm product for which the demand may be said to be in a measure elastic, decreased, in this country, from 12.8 pounds per capita in 1840 to 11.5 pounds per capita in 1910. Production, at least, has not expanded for this farm product faster than the growth of population.

Again, a degree of elasticity is given to the demand for cereals through the consumption of distilled and malt liquors and to products of the vineyard through the consumption of vinous liquors. The total cost of materials in the manufacture of distilled and malt liquors in the United States in 1909, however, amounted to only about 5 per cent of the total value of cereals for that year, so that the demand as a whole in this connection is relatively unimportant. The cost of materials in the manufacture of vinous liquors for the same year amounted to about 30 per cent of the total value of grapes produced in that year, but the industry as a whole is relatively unimportant. The total consumption of all three kinds of liquors as a whole has almost doubled per capita since 1882, but the expansion has been entirely in malt liquors. Since 1871 the consumption of malt liquors per capita has trebled.

The demand for hides in the manufacture of footwear and other leather products contributes an element of elasticity of demand for cattle and for other farm animals. On the whole, however, this demand is chiefly incidental to the demand for these animals for other purposes and is also met to an important extent, in this country, by the importation of large numbers of hides and skins.

Lastly, the demand for corn and oats in the maintenance of work-animals and the demand for corn and potatoes in the manufacture of glucose, starch, and alcohol may be considered. The demand for feed for farm work-animals evidently depends, ultimately, upon the demand for farm products in general, and this will be shown to be, on the whole, inelastic. Under present circumstances the highly elastic demand for power in the city industries and activities takes the form of a demand for mechanical rather than for animal power. Finally, the demand for corn and potatoes for the industrial purposes indicated, while relatively elastic in character, is yet very small in comparison with the relatively inelastic demand for the same products for other purposes.

On the whole, therefore, there is at present no considerable measure of elasticity of demand for these products from any of the directions suggested.

Within any particular country the most important factor influencing the degree of elasticity of demand for the products of the farm is the export or import of those products, though this is not a factor of direct importance for the agricultural products of the world as a whole. Export or import may contribute materially to elasticity of demand for particular farm products everywhere, however, by facilitating substitution of one product for another in case relative values change. In this country this factor has operated mainly through the export of cotton, tobacco, grain, flour, and meat products, and through the import of raw wool, raw sugar, and tropical fruits. Exports and imports of manufactured products have influenced the demand for agricultural products to some extent, as the latter enter as raw materials into the production of the former. The export of manufactured products, however, has influenced the direction rather than the extent of the demand for agricultural raw materials in this country, since otherwise these raw materials would probably have been exported in their raw form.

On the whole, therefore, the demand for the products of the farm is seen to be essentially inelastic in character. This is especially the case with respect to food products as a group, though higher prices or diminished purchasing power may lead at times to diminished consumption of food, through the elimination of waste, in a community or country with a generous or wasteful standard of life. With respect to particular food products, a considerable measure of elasticity of demand may be afforded by the substitution of one food product for another as relative values change. This substitution is facilitated by the export or import of food products, and, in any given country, export of agricultural products in general may greatly influence the degree of elasticity of demand for those products. For a few articles of food or drink the demand appears to be positively elastic in character, but the relative unimportance of these cases minimizes their significance as exceptions. With reference to the textile fibers and other agricultural raw

materials for the manufacture of articles of dress, there is seen to be a considerable degree of elasticity of demand, due to the character of the demand for the finished products. In our own country, however, the large importation of linen goods, of raw silk, and of wool has prevented a corresponding expansion in the production of flax and of the latter two fibers, and only in the case of wool is our production sufficiently important for fluctuations in importation to affect our agriculture materially. Elasticity of demand with respect to cotton is, in this country, diminished by the fact that we produce so large a proportion of the world's supply of raw cotton; as there is no other country to which the world can turn for cotton in material quantities.

Further, though it may not be necessary to accept, in full, the view that the operation of the law of diminishing returns is exclusively characteristic of agriculture and of the other extractive industries, probably few will deny that that law operates at least more regularly and more sharply in agriculture than in the non-extractive industries. Accordingly, we may expect prices to be better maintained in the long run with reference to agricultural products, and hence one condition—that of falling prices—to the expansion of demand for agricultural products with a relatively elastic demand may be lacking. Conversely, since the law of increasing returns operates less regularly and less sharply, to say the least, in agriculture than in the non-extractive industries, there will, again, be less tendency for decline in price to stimulate the demand for those agricultural products characterized by an elastic demand.

Moreover, whatever degree of elasticity of demand for certain agricultural products may be apparent is small compared with that for the products of the non-agricultural industries. The world's annual production of iron has increased more than fifteen fold since 1850 and nearly a hundred fold since 1800. In the United States the increase in the production of iron from 1850 to 1913 was more than fifty fold. There has been a similar expansion in the production of coal—especially in the United States, where the output increased from 6,266,233 tons in 1850 to 508,971,540 tons in 1913. Since 1870 the output of coal per capita has more than sextupled in

this country. The average number of wage-earners employed in manufactures in the United States has more than quintupled since 1860, while population has somewhat more than trebled; and the output of manufactured products has increased much more rapidly than workers in manufactures have increased.<sup>1</sup>

It is not so much in the increase in the demand for and the production of particular non-agricultural commodities, however, as in the increasing variety of those commodities and activities that the difference between agriculture and other occupations appears. David A. Wells estimated in 1889 that probably one-half of those persons who then earned their living in industrial occupations were employed in occupations that were not only not in existence a hundred years before, but were not even conceived of at that time. This diversification in the non-agricultural industries has undoubtedly made even more rapid progress in the last quarter of a century. To take a recent illustration of a new industry, it is stated that during the year 1913 \$275,000,000 was paid by the general public in this country for admission to the various motion-picture houses, and that more than 11,000,000 persons visit moving-picture theaters daily in this country. This is a remarkable but not unique showing. The value of products in the manufacture of phonographs and graphophones more than quintupled in this country in the last census decade and the number of workers employed more than quadrupled. This is all the more remarkable in view of the fact that the value of products in the combined piano and organ industry in the United States increased nearly thirty-five fold from 1850 to 1910, while wage-earners employed in the same industry increased nearly seventeen fold.

So generally is the capacity of the non-agricultural industries and activities to expand realized, when attention is directed to that fact, that it is almost unnecessary to present statistics to demonstrate that characteristic; and the facts here presented are more for the purpose of illustration than for proof.

Equally well recognized is the tendency of many of the non-agricultural industries and activities decidedly to narrow the

<sup>1</sup> The recent development of our exports of manufactured products should be kept in mind in this connection.

extent of their operations during periods of pronounced depression and diminished purchasing power. At such times demand for the products of these industries fails to receive the customary stimulus from falling prices and both price and demand may decline to the minimum.

### III

Granted, then, the relatively inelastic character of the demand for farm products in general, what are the important consequences, theoretical and practical?

1. It may be pointed out, in the first place, that this characteristic of inelastic demand helps to explain why speculation finds such an important sphere of operations in the field of agricultural products. Speculation aims at making a profit out of price fluctuation, and, other things being equal, price fluctuation is in proportion to the inelasticity of demand for a good. It is true, of course, that farm products are subject to great variations in supply, due to the vagaries of the weather and to variations in other natural factors, and that this is also an important factor in explaining price fluctuation with respect to those products, and consequently in explaining speculation. But the inexorable character of the demand for these products, up to a certain point, and the almost total default in demand after this point has been reached, afford the necessary background and condition for variation in supply to work out its full effects with reference to price fluctuation. Relatively small surpluses and deficits in farm products—not to speak of large surpluses and deficits—have a relatively large effect on the price, and speculation is thus promoted.

2. It may be noted, in the second place, that since international trade in grain and in other farm products enables the crop deficits of one country to be offset by the crop surpluses of other countries, thus equalizing demand and supply for the world as a whole and thus affording a very considerable measure of elasticity in demand in the country or countries with crop surpluses and of elasticity of supply in the country or countries with crop deficits, tariff restrictions or other restrictions with reference to international trade in farm products necessarily emphasize the effect of inelasticity of



demand and supply and thus greatly emphasize price fluctuation. Foodstuffs attain to famine prices in one country and decline to a low price level in other countries one year, and the following year the situation may be completely reversed. Speculative conditions are thus everywhere exaggerated. Spurred on largely to increase acreage by the excessive prices resulting from the shortage of one year, the agriculturists of a country are likely largely to overproduce under the probably more favorable crop conditions of another year. Discouraged, in turn, by excessively low prices, farmers will limit decidedly the acreage of the crop in question, and bad crop conditions and short acreage may again coincide, with the result of another series of famine prices—and so on indefinitely. If the country be small, so that the abnormally good or bad crop conditions in one section or with reference to one crop are not offset by the abnormally unfavorable or favorable conditions, respectively, with reference to another section or crop, these conditions of shortage and of surplus will be exaggerated, with resulting especially exaggerated conditions of price fluctuation and of speculation in the growing and marketing of farm products. In a large country like our own such results are likely to be less exaggerated, though still manifesting themselves to an important extent. The operation of these tendencies was signally illustrated in Great Britain and Ireland during the period of the Corn Laws of 1816–46. So uncertain did grain-growing become under the conditions thus established that the period as a whole was, for farmers, far from being a prosperous one; while the masses of the population alternately experienced famine prices and cheap bread. The interests of both farmers and consumers were undoubtedly sacrificed, in the long run, by this restrictive policy. If it be one of the virtues of legitimate speculation that it causes an equalization of prices by affording a better distribution of supplies from time to time and from place to place, it must therefore be counted one of the undesirable results of tariff restrictions on farm products that exactly the opposite effects are to be expected. The free movement of grain and of other farm products in international trade does indeed extend the scope of speculation, since a world-market is substituted for a merely local market. On the other

hand, speculation is intensified within a given country by the restrictive policy. But by freedom of international trade the legitimate functions of speculation are facilitated, while under conditions of restriction an artificial stimulus is given to speculation because natural maladjustments of demand and supply are emphasized by the policy of restriction. On account of the generally inelastic character of the demand for farm products, therefore, as well as on account of the wide variation in the supply of such products in a given country from year to year, tariff and other restrictions with reference to international trade in farm products are peculiarly objectionable.

3. Another interesting result of the characteristic of inelastic demand for farm products is the fact that popular judgment, and even the opinions of authorities occasionally, with reference to the extent of the surplus or of the shortage of a particular farm crop or product or of farm products in general is subject to sudden and violent change as well as to wide departure from the actual facts in the case. Since a relatively small shortage in a farm product—particularly a food product—has a relatively large effect on the price, popular, and occasionally expert, opinion immediately jumps to the conclusion that the shortage must be proportional to the rise in the price. Similarly, with a relatively small surplus and a resulting relatively heavy fall in price, the immediate conclusion is that there exists a correspondingly heavy surplus. Within a short time the change of a deficit to a surplus or of a surplus to a deficit, with corresponding disproportionate price changes, leads to a complete reversal of opinion.

A number of striking illustrations of this tendency thus to miscalculate could be presented, but it will suffice to mention a few such illustrations.

When Justin S. Morrill was making his great speech in the House of Representatives, on April 20, 1858, in favor of his bill of the previous December proposing grants of land in favor of state agricultural and mechanical colleges, his emphasis was first and foremost upon soil exploitation and exhaustion, and upon decline in crop yields and in other farm products. Representative Morrill was also influenced in his notions by prevalent errors with regard

to the extent and possibilities of the "Great American Desert," nor could he have anticipated the rapidity with which the construction of railroads was to lead to the opening up and the bringing into cultivation of the remaining public domain. He was thus impressed with the conviction of an impending shortage of food supplies in the United States, and this conviction constituted the motive, to a large extent, of the plan he had in mind. But there is little doubt that he interpreted these other factors in the light of the high prices for wheat that had prevailed since 1853, that he failed to take into account the fact that a relatively small deficit in farm products brings greatly disproportionate results so far as price is concerned, and that he was thus led to overestimate the danger of impending shortage accordingly. "While we ought," he said, "to possess the granary of the world, it has been but a brief time since bread-stuffs rose almost to starvation point, and indicated the possibility that we might not forever escape the only test, that of famine, to which our institutions have not been subject." It is interesting to note that in reality during almost the entire generation following the land grant to agricultural and mechanical colleges, in 1862, agriculture was characterized, in general, by a chronic condition of overproduction and low prices. This was the main reason, too, why these colleges were, so far as agricultural education was concerned, practically ignored during this period.

A similar fear of national food shortage obtained from about 1836 to 1840, when we were importing foodstuffs to an appreciable extent and when prices had been extremely high for a few years. This fear found expression in the writings of Jesse Buel, Willis Gaylord, Luther Tucker, and others about 1840, and no doubt was unduly emphasized by the failure to appreciate the nature of the demand for agricultural products and the corresponding influences upon price.

Another striking illustration occurred within recent years in connection with the production of cattle and beef and of corn. In 1905 a representative of the American Live Stock Association in discussing overproduction in corn and in the live stock industry expressed a conviction of the impending ruin of the live stock interests of the country unless an outlet could be secured in

the foreign market. At the same time we had commissions in Europe with the object of persuading the people of that continent to take more kindly to a corn diet, so that larger outlet for our surplus corn might be developed. But it was hardly five years until we were experiencing a shortage in our supplies of meat, and immediately the belief that the day of cheap meat is past became widespread! Further, when the price of corn increased in a very few years to such a figure that foreign exports dwindled to almost nothing, interest in developing a foreign market for corn similarly diminished to the vanishing-point. In all probability, had not the present great war in Europe intervened to relieve us of the surplus wheat from the enormous crops of 1914 and 1915, the price of wheat would have fallen to a point that would have brought back once again the complaint of overproduction in that crop. It is to be granted, of course, that during recent years there has been a tendency for demand to outrun supply because of heavy foreign immigration, chiefly to the urban centers, and because of the continued trend of the rural population to the city; but there can be no doubt that the striking changes in the price of farm products and the accompanying violent change in popular opinion with reference to the possibility of food shortage have been due to a very considerable extent to the fact of inelastic demand for the products of the farm. The careful student of these conditions will therefore make a proper discount with regard to these prevalent views.

4. One of the most important results of the fact of inelastic demand for agricultural products, generally speaking, is its fundamental importance, jointly with improvement in the powers of production in agriculture, in bringing about the world-wide trend of population from country to city. There are, of course, other, and weighty, reasons for this general trend cityward. One of the chief of these is the development of occupational division of labor, consequent on the growth of transportation and of power manufacturing, as a result of which many operations and processes formerly carried on in connection with agriculture have been separated from that branch of human employment and concentrated in centers of industry, which thereupon became centers of population. It seems probable that this was the most important urbanizing influence in

earlier years. But in more recent years the inelastic character of the demand for the products now raised on the farm has afforded a bar to expansion in the production of those commodities proportional to the improvements introduced in agriculture; and the consequence of the introduction of these improvements—especially improved agricultural machinery—taken in connection with the indisposition of demand for agricultural products to expand beyond a certain limit, has been to transfer workers by the millions from the farm to the urban centers. The city has gathered to itself, not only manufactures, but many other activities for the products of which demand is of the elastic sort. The city has thus become, as compared with the country, the center of expansion in industry and thus in population. In agriculture, labor-saving devices are really “labor-saving,” in the social sense, because of the inelastic character of the demand for the products of the farm; in the city industries and activities, however, because of the expansive demand for the resulting products, labor-saving devices have proved not “labor-saving,” in the social sense, but rather “product-increasing.” Therefore, as improvements have been introduced into agriculture that have multiplied the powers of agricultural production, many workers have been set free from the stern necessity of providing food and the materials of clothing and have been able to give their attention to the satisfaction of a constantly increasing number of other more expansive wants. A constantly diminishing proportion of the population is therefore sufficient to feed and clothe the population as a whole. In our own country, and in some other countries, the number of agricultural workers has increased as a whole, but has nevertheless constituted a rapidly declining proportion of the total workers of the country.

It has often been said that the improvement in the powers of production in agriculture—and particularly the introduction of labor-saving machinery in agriculture—has been, of itself, a main cause of the diminished proportion of workers in agriculture. But apart from the nature of the demand for agricultural products improvement in the powers of production would have been, of itself, no sufficient or necessary factor in the situation. For

there can hardly be any question that improved processes and improved labor-saving machinery were introduced into manufactures at an earlier date and have been introduced on a far wider scale in that branch of industry than has been the case in agriculture; and yet not only the total number of people engaged in manufactures, but the proportion of the total population so engaged, has increased rapidly and largely. The difference between the effects in the two branches of employment lay in the difference in the nature of the demand for the respective products.

So little was the difference in the nature of the demand for agricultural products and for the products of manufacturing appreciated, that when manufactures had their early beginning as a separate industry in this country the partisans of manufactures defended themselves against the charge that workers would be diverted from agriculture by asserting that the use of labor-saving machinery, together with the employment of a few women, boys and girls, and immigrants would obviate this asserted difficulty. In fact, as late as 1850 a college professor,<sup>1</sup> speaking before the Cumberland County Agricultural Society, in Maine, expressed the belief that on account of the slower introduction of improvements in agriculture as compared with commerce and the arts the tendency would be for a larger and larger proportion of the total population to be engaged in agriculture! Notwithstanding the fact that agriculture was just then entering upon the period of large introduction of labor-saving improvements, the same thing can be said even more emphatically, in a relative sense, with regard to manufactures. This speaker was led to make this very mistaken assumption because he failed to take into consideration the fact that the demand for agricultural products is a limited and inelastic demand while that for manufactured products is, comparatively, an elastic and indefinitely expanding demand. A speaker<sup>2</sup> at a farmers' convention at New Haven, Connecticut, December 20-22, 1892, saw the matter much more accurately and

<sup>1</sup> Professor J. R. Loomis, of Waterville College.

<sup>2</sup> J. M. Hubbard, member Connecticut State Board of Agriculture, from Middlesex county.

put the situation succinctly and admirably. In discussing the cause of the depletion of the rural population he said:

It is worth while to note in this connection the difference in effect upon agriculture and mechanical industries of the employment of labor-saving devices. The productive power of labor has been multiplied many fold thereby, but while new forms and increasing quantities of mechanical products are absorbed by our population, to an extent limited only by the possession of means to pay for them, the consumption of staple agricultural products is not subject to any corresponding enlargement. The man of today does not want any more bread and meat than did the man of a hundred years ago.

Consumption of products thus being limited (in agriculture), and the productive power of the individual largely increased, it is inevitable that there should be a decrease in the number of producers.

This resident of "a quiet, strictly rural neighborhood" in Connecticut had a much more accurate knowledge of the principles of economics than the earlier college professor, though of course the former had the advantage of observing the results of nearly half a century's further development. The inevitable character of the trend of population to the urban centers had indeed been recognized by men like Professor George Tucker, of the University of Virginia, and by others, in the early forties; but they seem not to have appreciated fully, as a cause, the operation of the economic forces so clearly recognized by the Connecticut rural economist a half-century later. By the later date, to be sure, and even earlier, there were not a few other careful students of the problem who recognized this same economic law as operating in the cityward movement. The surprising thing is that today so many intelligent and supposedly educated persons fail to appreciate its profoundly important agency in this connection.

There have undoubtedly been other reasons for the maintenance of the rural population on the soil in the South, but it can hardly be doubted that the character of the demand for cotton, as contrasted with the character of the demand for important agricultural products in other sections of the country, has had no little influence in retaining so large a proportion of the population of the southern states on the land. The lack of decided competitive advantages in the growing of wool and in the production of the sugar beet in this

country, and the resulting large imports of both raw wool and raw sugar, have prevented these two industries from exercising the effect, in retaining the rural population on the soil, that might have been anticipated, considering the relatively expansive character of the demand for the products in question. That neither of these two branches of agriculture in general is a "machine" type of agriculture has made it difficult to retain them, even with protection, as important branches of our northern agriculture, and has deprived us, in a large measure, of their influence in the retention of the rural population on the soil.

5. A further important conclusion with reference to the distribution of population between country and city may be drawn on the basis of the difference in the nature of demand for farm products and for the products of the city industries. This distinction will exist, of course, so long as there is the present occupational division of labor between city and country with the resulting specialization in each section in the class of commodities now produced. Until the course of industrial evolution halts, therefore, and reverses its movement, and manufactures are once again combined with agriculture, we may expect further improvement in the powers of production in agriculture to result in a further diminution of the *proportion* of population engaged in agriculture, though the *total number* of people engaged in agriculture may continue to grow as it becomes necessary to utilize the soil more intensively and as the law of diminishing returns thus operates more sharply. Increasing intensivity in the utilization of the soil by no means necessarily implies, however, any large increase in the use of human labor, and the anticipated more decided operation of the law of diminishing returns is likely to restrain the growth of population as a whole rather than result in a transfer of workers back to the land.

The expectations, then, of those who hope largely to increase the numbers of the rural population in our own and in other countries in the near future are vain, and the expectation of largely increasing the *proportion* of country dwellers is absolutely futile. Population will inexorably follow employment, employment will inevitably follow expansion of production, expansion of production will inevitably follow expansibility of demand, and expansibility



of demand will inevitably be associated with manufactured products and with those other commodities, utilities, and services which it is the province, under present economic conditions, of the urban community to provide. Unless all signs with reference to the probable future course of industrial evolution fail, or unless we are able largely to increase our agricultural exports far beyond their extent at present, and to turn from manufactures back to agriculture in many sections—a course that is, considering our natural resources for manufacture and the large development that manufactures have already attained, unthinkable—the hopes of those who wish to see our agricultural population “doubled” in the near future, or who ever expect to see a larger proportion of our total population rural dwellers, are but iridescent dreams incapable of realization.

Quite as much deluded are those who hope to increase the numbers of the rural population by promoting agricultural education, although for other reasons and in itself the promotion of agricultural education is of the highest importance. Technical agricultural education, by making the rural workers more efficient, has the same effect as a labor-saving device; and the effect of a labor-saving device is, as we have seen, to reduce or to retain at a relatively low level the proportion, if not the total number, of those engaged in agriculture. There is not the shadow of a doubt that the effect of the general introduction of methods that would largely eliminate losses due to insect pests and to ravages of disease among live stock, or of wide dispersal of the knowledge of improved animal and plant breeding, or of other improvements in the powers of production in agriculture, would be, generally speaking, to force out of agriculture a part of the workers, unless population should grow sufficiently to offset this influence or unless agricultural exports should find sufficient outlet in foreign markets. In the former case the proportion, at least, of the rural population to the total population would be decreased; and in the second contingency, any maintenance of the agricultural population in the exporting country would be at the expense of the agricultural population of the importing countries, proportionally if not in absolute numbers. Other things being equal and efficiency of labor remaining

the same, a diminution of the length of the working-day for the agricultural worker would tend to offset the effect of the introduction of labor-saving improvements in agriculture in reducing the number or the proportion of workers in agriculture, and this has already been the result to a certain extent. Considering the relatively long working-day still prevailing in agriculture, however, and considering the utter impossibility of arbitrarily "doubling" the number of workers in an occupation whose products are characterized by an inelastic demand, the limitation of the working-day on the farm may be commended, as a partial remedy, to those who wish to restore the numerical preponderance of our rural population or to insure that that proportion will not be further reduced as a result of labor-saving improvements to be introduced in agriculture yet in the future.

Though there is decidedly a country-life problem, just as there are city-life problems, neither of which it lies within the province of this paper to discuss, it may be safely asserted that the considerable or general increase in the number or the proportion of the rural population is no important part of either class of problems. So much the analysis of the difference between the nature of demand for agricultural products and that for the products of the city industries, under present conditions, clearly indicates; and he who would contribute materially to the solution of either country-life or city-life problems must appreciate this fact clearly.

By undue attention to the principles relating to production in agriculture and by failure to give attention to the principles relating to the nature of demand for agricultural products, the theorist has not only missed the opportunity to round out more adequately the general principles of the economics of agriculture, but he has missed, also, the opportunity to contribute to a better understanding, on the part of the general public, of the fundamental principles involved in some questions of great and pressing public importance.

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